Northwest Fisheries Science Center

Recovery Science
for Salmon in the Pacific Northwest

2009

NOAA FISHERIES SERVICE

Salmon Recovery Science is a well-developed and active area of research at the NWFSC. Some key areas of activity include:

- **A novel approach to recovery science, incorporating scientists from many disciplines and agencies in regional Technical Recovery Teams**
- **Modeling approaches that evaluate a range of impacts on population variability**
- **Experimental approaches to habitat restoration**
- **Evaluating the impacts of climate change**
- **Understanding the effect of ocean conditions on salmon populations**

Currently, 27 out of 52 salmon and steelhead (*Oncorhynchus* spp.) Evolutionarily Significant Units (ESUs) in the western U.S. are listed as threatened or endangered under the Endangered Species Act. The NWFSC has critical and active research aimed at achieving recovery of these economically and culturally important species.

Technical Recovery Teams (TRTs) and the Recovery Implementation Science Team (RIST)

The NWFSC undertook a unique approach to developing scientific information supporting conservation of anadromous salmonids. Collaborative Technical Recovery Teams, comprised of NOAA, academic, state, tribal, federal and other scientists, who were chosen for their scientific expertise, provide key scientific foundations for recovery plans including:

- Characterizing population structure within ESUs.
- Developing biological viability criteria for populations and ESUs.
- Evaluating of current population status.
- Reviewing and evaluating of proposed recovery actions and strategies.

The Recovery Implementation Science Team, also a multi-agency, multi-disciplinary science group, provides scientific support for implementing these recovery plans.

Estimating population responses to recovery actions

Estimating likely levels of risk currently faced by populations, as well as their response to planned human activities is an important component of recovering these species. Since the late 1990s, when the Cumulative Risk Initiative was kicked off, NWFSC scientists have been developing and refining population models to estimate the effect of hydropower actions, hatchery impacts, habitat improvements and changes in harvest regimes on the long-term persistence and status of these species.

Restoring tributary habitat for salmonids

After decades of urban development, agricukltural, forestry and energy development impacts, restoring freshwater habitats is a critical component of all recovery plans in the Pacific Northwest. NWFSC scientists are currently working on projects aimed to improve tributary habitat for anadromous fishes.

- Evaluating the effect removing passage barriers, such as the Elwha River dams and barriers in the Cedar River watershed.
- Assessing the impact of ongoing restoration activities such as dike removal, riparian plantings and log-jam placement on both habitat conditions and salmonid abundance and productivity.
- Developing monitoring programs to track changes in the environment and salmon populations.
- Evaluating the potential for habitat improvement across landscapes such as the Columbia River Basin.

Climate change and recovery

Salmonids are cold-water species, and predicted increases in temperature and decreases in summer flows under climate change are likely to affect their ability to survive and flourish in areas in which they are already listed, and may affect their viability in current strongholds. Current projects at the NWFSC are designed to identify likely impacts at a variety of scales.

- Identifying populations likely to be most vulnerable to climate changes and landscape characteristics most likely to support resilient populations.
- Estimating the effects of changes in stream flow and temperature on habitat and salmonid populations.
- Evaluating the efficacy of habitat restoration actions in the face of climate change.

Salmon populations and the ocean

Salmonids spend a majority of their life cycle in marine and estuarine environments, and mortality in the early ocean life stage is not only extremely high (90% or greater), but also is a key determinant of overall productivity. NWFSC scientists are working to understand the factors that affect survival and mortality at this stage with these and additional studies:

- Evaluating associations between large-scale climatic factors such as the El Nino Southern Oscillation and Pacific Decadal Oscillation and salmonid abundance and productivity.
- Measuring physical and biological metrics in the Columbia River estuary, and linking them to salmonid abundance and productivity.
- Using physical and biological indicators to predict likely returns of chinook and coho salmon.

Learn more & come see us in action

Sharing our work with other scientists, with policymakers, and with the public is important to us. To learn more about what we do, please visit our website at: www.nwfsc.noaa.gov.

Find more information about the exciting work the TRT and RIST teams are doing at: http://www.nwfsc.noaa.gov/trt/index.cfm.

More information on the Cumulative Risk Initiative is at: http://www.nwfsc.noaa.gov/research/divisions/cbd/salmonrecovery.cfm.

Specific information about habitat restoration can be found at: http://www.nwfsc.noaa.gov/research/divisions/ec/wpg/index.cfm.

For information on salmon populations and the ocean go to: http://www.nwfsc.noaa.gov/research/divisions/fed/oeip/a-ecinhome.cfm.

To arrange a visit or obtain additional information, please call 206-860-3200.